



Development of a Long-Term, Post-Closure Radiation Monitor



Developer: Babcock & Wilcox, Inc.
Contract Number: DE-AC21-92MC29103
Crosscutting Area: CMST

Subsurface
Contaminants
FOCUS AREA

Problem:

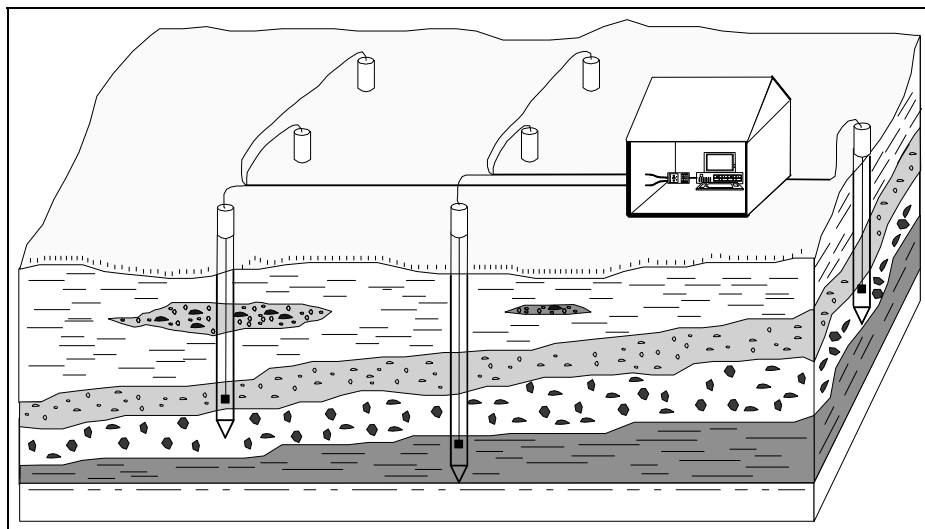
Monitoring of radionuclides at DOE waste sites is necessary to determine if there may be potential impacts to human health or the environment based on the characteristics and movement of the radionuclides present. Monitoring will likely continue long after site cleanup has been completed. This post-closure monitoring of radionuclides will require that large numbers of sensors be installed below ground surface and monitored for long time periods (30 years is typical). Existing monitoring systems are too complex and expensive to maintain in place for long time periods.

Solution:

Configure commercially available components into a reliable, low-cost, multi-point system for long-term, post-closure monitoring. This system is based on gamma detection and is planned to be capable of monitoring to depths of more than fifty meters below ground level without having to drill wells. Scintillator probes are installed at each measurement location and are multiplexed to a single above-ground electronics unit. The individual scintillators will be located inside hollow tubes installed vertically or horizontally in the vadose zone at a waste site, using cone penetrometer technology.

Benefits:

- ▶ Provide in situ long-term and real-time measurement techniques for monitoring contaminant leakage.
- ▶ Each scintillator is relatively small and can be produced at low cost.
- ▶ Scintillator is passive and operates at ambient temperatures; downhole components have demonstrated reliability.
- ▶ Long lived with components readily accessible for any required maintenance without soil disturbance.
- ▶ All system components are commercial or near-commercial.



Technology:

This radiation monitoring system is based on gamma detection and is designed to be capable of monitoring large numbers of permanently installed probes. Major components of the system incorporate commercially available scintillation, detectors, and signal processing electronics. Scintillation probes are installed to depths necessary to adequately monitor a



